

**STATEMENT OF
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**BEFORE THE
SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
SUBCOMMITTEE ON SURFACE TRANSPORTATION AND MERCHANT MARINE**

**HEARING ON FATIGUE IN THE
RAILROAD AND TRUCKING INDUSTRIES**

September 16, 1998

Madam Chairman and Members of the Subcommittee, I am George Reagle, Associate Administrator for Motor Carriers at the Federal Highway Administration (FHWA). I would like to thank you for the opportunity to testify before this Subcommittee on driver fatigue, an issue of great importance to us all.

Transportation safety is high priority for your Subcommittee, so well demonstrated with the passage of the "Transportation Equity Act for the 21st Century" (TEA-21), and it is a high priority for us at the Department of Transportation. Our dedication to safety is reflected in our Strategic Plan, where we resolve to reduce the number of transportation crashes, focus on human performance and behavior to improve safety, and promote new technologies for safety.

To meet these safety objectives, the FHWA has many serious efforts underway -- in research, in safety applications, in enforcement, and in safety education -- and I hope there may be further opportunities to discuss all of these issues with your Subcommittee. But, today our focus is on commercial driver fatigue. I would like to share with you what the FHWA is accomplishing in driver alertness research and outreach and comment on the hours-of-service (HOS) rulemaking we have undertaken

at the FHWA.

We conveniently use the term “fatigue” as shorthand for the various complex states of sleepiness, drowsiness, and low-alertness. One well-known British scientist, Ivan Brown, defines “fatigue” as the decreased capability of doing physical or mental work, or the subjective state in which one can no longer perform a task effectively. But, no scientist can really measure “fatigue” per se. What they can measure is how alert people are, how they perform tasks that require sustained attention, hand-eye coordination, and responses to changes in their environment. Scientists also can measure changes in how the body functions -- changes in brain wave patterns, changes in eyelid position, changes in head position--that reflect how alert or how drowsy a person is. So today, to be as accurate as possible, I will use the terms “alertness” and “drowsiness.”

Quantifying the Drowsy Driver Problem

Of course, the problem of the drowsy driver is not just about commercial drivers. Last year the New England Journal of Medicine told us that drowsiness is a pervasive problem with all drivers, citing polls that have found that up to 56 percent of the general public drives while drowsy -- with a cost to society of more than \$12 billion a year from related crashes. Other researchers say that nearly one-half of Americans have difficulty sleeping. Those who have one type of sleep disorder referred to as “sleep apnea” were found to be involved in three times as many auto accidents as the rest of the population.

To investigate the role of drowsiness in crashes, we first turn to crash data. Although many factors contribute to crashes, the data point to the driver as a critical contributor.

Unfortunately, current crash data cannot tell us enough about the driver's state of alertness at the time of the crash. Crash-related factors are recorded at the scene by a police officer, and it is difficult for an investigating officer to determine, after the fact, if loss-of-alertness played a role. Involvement in a crash is likely to eliminate any signs of drowsiness in a driver if the driver survives the event. In addition, loss-of-alertness may play a secondary role, contributing to recognition errors--such as distraction or inattention-- that might be cited on a crash report.

Although driver drowsiness is cited as a contributing factor in a relatively small percentage of truck crashes, the FHWA believes it actually plays a larger role than the data indicate because of the difficulty in accurately identifying signs of drowsiness after a crash.

Between 1992 and 1996, combination-unit trucks were involved in an annual average of 3,132 fatal crashes, 13.6 percent of which (427) were fatal to the truck driver only. Drowsiness was cited as a driver-related factor in 11 percent of the cases where the truck driver was the sole fatality, and 1 percent of the cases where someone other than the truck driver died. The figures appear even smaller for non-fatal combination-unit truck crashes, about 0.5 percent of which appear to be related to drowsiness.

Research studies based on analyses of crash cases often consider driver loss-of-alertness to be a factor in more crashes than the national statistics indicate. However, concerns have been raised about how these results can be generalized to all truck crashes. In one frequently cited 1995 study, the National Transportation Safety Board (NTSB) examined 107 single-vehicle roadway departure crashes where the truck driver survived and no other vehicle was involved. The NTSB found that 58 percent of these crashes were fatigue-related. The study specifically focused on crashes where driver drowsiness was likely to be a contributing factor and it focused on only one type of crash. Another NTSB study, completed in 1990, drew data from 182 fatal-to-the-driver truck and bus crashes in 8 States. Driver fatigue was implicated as a causal factor in 31 percent of these crashes.

Alertness Research at the FHWA

Even though crash data are not conclusive, other areas of analysis are giving us useful new information about fatigue. The “human factors” involved in transportation crashes, particularly driver alertness, form a major area of study for the FHWA and the Department’s other transportation modes. The FHWA currently has more than 15 studies on driver alertness underway, and we are conducting these from a “One-DOT” perspective. We actively participate with the other modes on a Fatigue Working Group and a Human Factors Coordinating Committee.

The FHWA’s Driver Fatigue and Alertness Study (DFAS) -- completed in January 1997, is the most comprehensive over-the-road study on commercial driver alertness ever conducted. The DFAS was both a public-private and an international partnership. In addition to the funding provided by the FHWA, the Trucking Research Institute (TRI) of the American Trucking Associations’ Foundation and Transport Canada funded significant portions of the data collection and analysis effort. The TRI, the National Private Truck Council, the International Brotherhood of Teamsters, and the Owner-Operator Independent Drivers Association -- all provided considerable input in public forums. These organizations, as well as the Canadian Trucking Association and the Private Motor Truck Council of Canada, helped recruit motor carriers and drivers and provided technical and operational support to the research effort. Over-the-road data was collected both in the U.S. and Canada. Three major for-hire motor carriers in the U.S. and Canada had drivers “on the road” under two types of 10-hour schedules (in the U.S.) and two types of 13-hour schedules (in Canada).

The study had several objectives:

- To establish measurable relationships between CMV driver activities and

physiological and psychological indicators of fatigue and reduced alertness;

- To identify and evaluate the effectiveness of those alertness-enhancing measures that legally may be used by CMV drivers. Approximately 500 drivers were surveyed in 4 locations (West Coast, East Coast, Midwest, Southeast); and
- To provide a scientifically valid basis to determine the potential for revisiting the current HOS requirements, which have been essentially unchanged for more than 50 years.

Today, I will not go into detail about the study design, method and results, but I have attached to my testimony a comprehensive summary of the study for the record.

Let me describe the major study findings:

- We found that time-of-day had more influence on alertness than cumulative time on duty. Drowsiness was found more likely to occur when driving between midnight and dawn than at other times;
- The drivers in the study did not get enough sleep compared to their “ideal” sleep needs. Drivers obtained an average of about two hours less sleep than their daily “ideal” sleep;
- Drivers’ self-assessments of their alertness did not correlate well with objective performance measures; the drivers had a tendency to rate themselves as more alert than the performance tests indicated; and

- There were significant differences among the study drivers in levels of alertness and driving performance.

One of the most important things we learned from the Driver Fatigue and Alertness Study -- and from several other studies we have reviewed -- is that the amount of time spent performing a task is not by any means the only factor affecting a person's alertness. Many research studies have only examined the amount of time a person performed a task such as driving a car, operating a driving simulator, or using a radar screen. Some of these studies tested participants during the same period of time every day. Others varied the test times, but did not gather information on when the participants slept. The bottom line is this: while "time on task" is an important contributing factor to a person's level of alertness, the time of day a task is performed seems to be even more important.

Of course, the other side of this issue is sleep. The time of the day or night a person sleeps, the amount of sleep a person obtains, and the quality of sleep -- all affect our alertness.

Many studies of shift workers point to reports of problems getting enough sound sleep during the daytime. The long-distance truck or bus drivers' working schedules turn many of them into long-distance shift workers. They have to contend with irregular sleep and wake cycles and face the challenges of finding a safe place to park and sleep. Team drivers also must contend with sleeping in a moving vehicle.

We also have a great deal of work underway to develop ways to detect driver drowsiness through changes in driving patterns, body functions, and alertness levels. Much of this work is co-sponsored by the FHWA and the National Highway Traffic

Safety Administration (NHTSA) in their research and development and intelligent transportation systems programs. We are exploring the full spectrum of preventing loss of alertness by giving drivers the tools to help them self-monitor their wake and sleep cycles. We are exploring devices installed on the vehicle, or worn unobtrusively by the driver, to monitor or predict changes in alertness and performance. These can give the drivers an early and reliable warning in time for them to safely pull over and take a nap.

One of the most promising studies is a project the FHWA, the Federal Aviation Administration, the Federal Railroad Administration, and the Department of the Army are co-sponsoring to study the effects of different “doses” of sleep on driver performance. We hope to use results from this study to improve an activity- and sleep-monitoring device developed by the Army -- the Actigraph. It is about the size of a wristwatch and it may be able to predict the wearer’s alertness based on prior sleep and wake patterns.

Driver monitoring is a key component in the new ITS Intelligent Vehicle Initiative (IVI). Plans are underway for an operational test of continuous driver monitoring systems as well as other on-board monitors. Both the FHWA and the NHTSA are cooperating in this initiative.

The FHWA believes all these studies will yield valuable insight into the problem of the drowsy driver, support development of effective countermeasures, and help us determine the changes that may be needed to the current hours-of-service regulations. Ultimately, we believe this research will improve our ability to take preventative action to keep crashes from occurring.

Investing in Infrastructure to Help Drivers Keep Alert

The FHWA also is investing in roadways that can alert the drowsy driver. Continuous shoulder rumble strips have generally been shown to reduce the rate of “run off road” crashes by 20 percent or more. On highways with extremely monotonous driving conditions, such as freeways in the desert Southwest, reductions in “run off road” crashes rates as high as 50 percent may be expected. Because of these crash reductions, shoulder rumble strips have been widely installed on the Interstate and other roadway systems by many highway agencies. The recently approved AASHTO Strategic Highway Safety Plan also calls for States to “retrofit the rural interstate and other fatigue-prone facilities with shoulder texture treatments” over the next 3-4 years.

Under the National Highway System Designation Act of 1995, highway rest areas are eligible for 100 percent Federal funding. Adequate and safe parking for interstate motor carriers is essential to helping drivers get the quality sleep they need to stay alert. The FHWA is taking an active role in addressing the shortage of safe rest areas for drivers and will devote a special day to this issue in December this year in conjunction with the second Truck and Bus Safety Summit. Pursuant to TEA-21, the FHWA also will conduct an assessment of the availability of commercial parking spaces on the National Highway System.

Alertness Education

Research and technology will not reduce drowsy driving without a parallel education effort to let drivers know how they can protect themselves. The FHWA, industry, the American Trucking Associations' (ATA) Foundation, the National Private Truck Council, the Commercial Vehicle Safety Alliance, and the AAA Foundation for Traffic Safety have collaborated to improve truck drivers' knowledge and understanding of alertness,

the conditions and practices that improve sleep, sleep apnea, and ways to reduce the risk of drowsy driving. This outreach effort is designed to reach commercial drivers, dispatchers, risk managers, and shippers to explain current knowledge about alertness and effective countermeasures.

At the direction of the Congress, the FHWA, the ATA Foundation, and its outreach specialists have worked together to produce and distribute to 1,000 radio stations nationwide “Awake at the Wheel” public service announcements (PSAs) that provide tips from truck drivers to help all drivers reduce the risk of drowsy driving. We estimate that the PSAs have reached almost a billion listeners.

Together, we also produced and distributed “Awake at the Wheel” brochures, with the ultimate goal of placing the brochure in the hands of every commercial vehicle driver in the country.

A video/book package entitled *The Alert Driver* was developed and distributed to 35,000 motor carriers. This package is aimed at truck drivers and their families and contains useful information on sleep, alertness, and how families can help drivers maintain alertness through proper rest.

A “train the trainer” course, *Fatigue and the Truck Driver*, was developed and training sessions were presented to 100 instructors throughout the country. The instructors received detailed information on the latest scientific information on sleep, alertness, and countermeasures.

The FHWA also provided technical advice to the Owner-Operator Independent Drivers Association Foundation for a video for its members, “Dealing with Truck Driver Fatigue.” The FHWA is working with the Private Fleet Management Institute of the National Private Truck Council to develop a fleet-based driver wellness program.

We believe this alertness outreach has been successful, but we know more needs to be done in the future. In 1999, we plan to embark on a new fatigue education initiative, involving more partners and reaching an even broader audience with our alertness messages.

Hours-of-Service Rules

One of the objectives of the research effort I have outlined today was to determine

whether to revisit the FHWA's hours-of-service regulations. The maximum amount of time that commercial motor vehicle (CMV) drivers may drive their vehicles is specified in regulation, and these regulations apply to over 425,000 motor carriers and over 8 million CMV drivers. Every year the number of new carriers and drivers increases.

Under current Federal hours-of-service regulations, CMV drivers may drive up to 10 hours after a mandatory 8-hour minimum off-duty period. They also may not drive after being on-duty for 15 hours (including up to 10 hours of driving) after a mandatory 8-hour off-duty period. They cannot drive after having been on-duty 60 hours in any 7 consecutive days if the motor carrier does not operate vehicles every day of the week or after 70 hours in any period of 8 consecutive days if the carrier operates vehicles seven days a week. These regulations apply almost universally to the entire interstate motor carrier industry. In fact, one criticism of the current rules is that the "one-size fits all" approach is outdated and can no longer be enforced effectively.

The HOS regulations were originally developed in the 1930's by the former Interstate Commerce Commission (ICC) to establish minimally acceptable operating practices for driver scheduling. In 1938, the ICC requested the U.S. Public Health Service to conduct an investigation into CMV HOS in interstate commerce. This was the first scientific study to address driver alertness as related to HOS. The Public Health Service study supported the need for regulatory limitation of HOS to help ensure highway safety. In 1967, the ICC's responsibilities concerning motor carrier safety were transferred to the Bureau of Motor Carrier Safety (now the Office of Motor Carriers) of the FHWA, an agency within the then newly-created U.S. Department of Transportation (DOT).

Drivers record their duty status and driving time in a logbook. Our regulations allow a

carrier to substitute an automatic on-board recorder for the logbook. When roadside inspections were performed in 1996 we found that approximately 62 percent of the driver out-of-service violations discovered were related to hours-of-service and logbooks. On-site reviews of carrier management practices and safety compliance indicate that 18 percent of total citations issued to motor carriers relate to hours-of-service and logbooks. In other words, compliance with hours-of-service and logbooks represents a important issue for the enforcement community.

The FHWA is exploring innovative ways to improve compliance with hours-of-service and logbooks in cooperation with industry on a voluntary basis. We believe Global Positioning Satellite technology and complementary safety management computer systems are capable of providing a proactive, “real-time” approach to monitoring and controlling drivers’ hours. In April of this year, we announced a pilot demonstration project to record and monitor drivers’ hours of service through this electronic process in lieu of complying with the handwritten driver log requirements. Werner Enterprises of Omaha, Nebraska, became the first motor carrier to enter into an agreement to participate in the project. By July, over 5,000 Werner drivers were operating without the paperwork burden associated with paper log books. Instead, their hours-of-service are maintained electronically.

With the new authority to conduct innovative pilot programs that was provided under TEA-21, we expect the FHWA will be asked to carefully consider other ways to maintain safety and reduce the paperwork burdens of compliance.

Should we change hours-of-service? How should they be changed?

We have posed that question to the transportation community in an Advance Notice of Proposed Rulemaking on HOS issued in November 1996, pursuant to a requirement set forth in the Interstate Commerce Commission Termination Act of 1995. This action began a process that will likely result in the first major changes to the HOS in nearly 60 years. The rulemaking addresses the potential for both conventional HOS rules and alternatives that allow carriers the flexibility to tailor individualized programs for themselves. The ultimate goal of this rulemaking is to enhance driver and public safety and enhance CMV productivity.

When the comment period closed in June 1997, we had received over 1,600 comments. We are currently reviewing the comments and examining dozens of research reports cited and provided by the public. The Secretary has made a commitment to complete the rulemaking in the year 2000.

The FHWA's hours-of-service rulemaking activities will follow two parallel tracks. First, the agency will use contemporary scientific research to help us develop proposals for limits on duty-hours, and minimum off-duty hours, to help ensure that the drivers of CMVs are alert, well-rested, and ready to drive safely.

Second, as new drowsiness-detection technologies are developed and tested in the lab, we will carefully assess them and consider how they might be used to augment --or possibly, even substitute for--conventional HOS regulations. Of course, we must analyze any technologies to ensure they provide credible assurance of safe operating and scheduling practices and are accurate and reliable. We are now conducting these analyses.

As the FHWA analyzes the docket comments to its Advance Notice of Proposed Rulemaking on the issue of drivers' hours-of-service regulations, we are keeping in mind the concern that "one size does not fit all." We are taking the opportunity this rulemaking presents to analyze the latest scientific research on loss of alertness, circadian rhythms, and other factors. Our goal is to develop a proposed rule that can be tailored to the demands of the different operations that exist in the diverse industries that rely on commercial motor vehicles and the people who drive them.

Conclusion

There are no simple answers to questions about driver alertness. There have been

many changes in the motor carrier industry since HOS rules were first implemented in 1938. These changes clearly have warranted a new look at our regulations.

Vehicles have been improved, with better ride characteristics and climate control to enhance driver comfort and alertness. Highway pavements and geometrics are better designed and built with safety in mind. Yet, in the current competitive business environment, shippers make more demands for on-time delivery. Driver pay issues increase the tension about hours-of-service. Congested highways place new demands on a driver's attention and impose delays on cargo pick-up and delivery.

Our HOS rulemaking will address many of these issues. It is a deliberate process, designed to identify and analyze the costs and benefits of any change. We look forward to working with the Committee on this very important issue and welcome your comments and questions.

ATTACHMENT: September 1998 OMC BLUE SHEET.